NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

RESIDUE MANAGEMENT, MULCH TILL

(Acre)

CODE 329B

DEFINITION

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year-round, while growing crops where the entire field surface is tilled prior to planting.

PURPOSES

This practice may be applied as part of a conservation system to support one or more of the following:

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Maintain or increase soil organic matter content and improve soil tilth.
- Conserve soil moisture.
- Manage snow to increase plant available moisture.
- Provide food and escape cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland and other land where crops are grown.

This standard includes tillage methods commonly referred to as mulch tillage, or chiseling and disking. It applies to stubble mulching on summer fallowed land, to tillage for annually planted crops, and to tillage for planting perennial crops.

CRITERIA

General Criteria Applicable to All Purposes Named Above. Loose residue to be retained on the field shall be uniformly distributed on the soil surface. Combines shall be equipped with spreaders capable of redistributing residue over at least 80 percent of the working width of the header.

Residue shall not be burned.

Tillage implements shall be equipped to operate through plant residues without clogging, and to maintain residue on or near the soil surface by undercutting or mixing.

Planters, drills, or air seeders shall be equipped to plant in residue distributed on the soil surface or mixed in the tillage layer.

The number, sequence, and timing of tillage and planting operations, and the selection of ground-engaging components shall be managed to achieve the planned amount, distribution, and orientation of residue after planting or at other essential time periods. Acceptable alternative tillage sequences shall be initially determined by a residue budget using locally applicable data on residue production by crops and residue reduction by tillage machines. Further adjustments shall be made, as needed, during the tillage sequence based on field measurements of remaining residue.

Additional Criteria to Reduce Sheet and Rill Erosion. The amount of residue needed to reduce erosion within the soil loss tolerance (T) or any other planned soil loss objective shall be determined using current approved erosion prediction technology. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Tillage operations shall be limited to methods that leave residue on the surface and maintain the planned cover conditions.

Additional Criteria to Reduce Wind Erosion. The amount and orientation of residue needed to reduce erosion within the soil loss tolerance (T) or other planned soil loss objective shall be determined using current approved wind erosion prediction technology. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria To Maintain Or Increase Soil Organic Matter Content And Improve Soil Tilth. The amount of residue and the number and type of tillage operations needed to achieve the desired soil condition, shall be determined using the current approved soil conditioning index procedure. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria To Conserve Soil Moisture. A minimum quantity of 50 percent residue cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface. Partial removal of residue, by means such as baling or grazing, shall be limited to retain the amount needed.

Additional Criteria To Manage Snow To Increase Plant Available Moisture. Stubble shall be left standing as high as possible by the harvesting operation, but not less than 6 inches in any case.

Stubble shall be maintained in a standing orientation over winter to trap and retain snow. Loose residue may be removed providing that the remaining residue is left standing. Fall tillage operations shall be limited to undercutting tools such as blades, sweeps, or deep tillage implements such as rippers or subsoilers, in order to maintain stubble in a standing condition through the months when snow occurs.

Additional Criteria To Provide Food And Escape Cover For Wildlife. The amount of residue and height of stubble needed to provide cover shall be determined using an approved habitat evaluation procedure. Residues shall not be removed unless it is determined by the habitat evaluation procedure that removal would not adversely affect habitat values. Stubble shall be maintained standing over winter. Tillage shall be delayed until spring in order to maintain waste grain on the soil surface during winter.

CONSIDERATIONS

Excess removal of plant residue by such means as baling or grazing often produces negative impacts on resources. These activities should not be performed without full evaluation of impacts on soil, water, animal, plants, and air.

Mulch till may be practiced continuously throughout the crop sequence, or may be managed as part of a residue management system that includes other tillage methods such as no-till. Selection of acceptable tillage methods for specific site conditions may be aided by an approved Soil Tillage Suitability Rating.

Production of adequate amounts of crop residue necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops, and adjustment of plant populations and row spacings.

Consider that residue amounts will vary based on tillage equipment, seep, depth, and attachments.

Where improvement of soil tilth is a concern, use of undercutting tools will enhance accumulation of organic material in the surface layer.

Consider that while shredding may decrease equipment plugging, it may increase burial and over-winter decomposition of surface residue.

The effectiveness of stubble to trap snow increases with stubble height. Variable height stubble patterns may be created to further increase snow storage.

Leaving rows of unharvested crop standing at intervals across the field can enhance the value of residues for wildlife habitat.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and O&M described in this standard. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

Performance Criteria. This practice will be considered applied when the crop residue levels have been successfully established according to the tillage system. All systems must provide at least 30 percent residue cover after planting. The line transect method will be used to determine percent ground cover present.

This practice will be carried out consistent with the current year Iowa State University Extension Service Weed Control Guide (PM-601), pesticide label instructions, and the laws and regulations of the state of Iowa.

The following types of conservation tillage systems and variation are acceptable: Mulch Till. This system includes all other types of full-width tillage operations leaving at least 30% residue cover at planting time. Tillage tools commonly used include chisels, disks, field cultivators, or other suitable implements.

Weed control is accomplished by a combination of mechanical cultivation and herbicides.

OPERATION AND MAINTENANCE

No operation and maintenance requirements have been identified for this practice.

REFERENCE:

Field Office Technical Guide, Section I-C-1 Erosion Prediction.

Nutrient Management Standard 590

Pest Management Standard 595

Iowa State University Extension Service Weed Control Guide for the current year (PM-601)